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February 24, 2010

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Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Notice of Ex Parte Presentation (IB Docket No. 95-91; WT Docket No. 07-293)

Dear Ms. Dortch:

On February 23, 2010, representatives of Sirius XM Radio Inc. ("Sirius XM") met with FCC staff members by telephone to discuss issues associated with the above-captioned proceedings.

Sirius XM participants in the meeting were Terrence Smith, Craig Wadin, Riza Akturan, and James Blitz. They were accompanied by Robert Pettit and myself from Wiley Rein LLP on behalf of Sirius XM. The FCC participants were Julius Knapp, Ron Repasi, Salomon Satche, and John Kennedy from the Office of Engineering and Technology, Tom Derenge, Jay Jackson and Moslem Sawez from the Wireless Telecommunications Bureau, and Chip Fleming from the International Bureau.

During this meeting, Sirius XM provided further details and analysis of recent measurements that it has taken of Clearwire's WiMAX network in the Philadelphia market.[1] As this data was based on the real-world functioning of an operational WiMAX system, it provides a more transparent look into mobile handset performance than any other WiMAX-related information or description previously filed in these proceedings. Sirius XM also stated that this is more useful data about WiMAX-based devices than that developed through the WCS Coalition's demonstrations last year in Ashburn, Virginia.[2]

[1] *See* Letter from Terrence R. Smith, Corporate Vice President and Chief Engineering Officer, and James S. Blitz, Vice President, Regulatory Counsel, Sirius XM Radio Inc. to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission, IB Docket No. 95-91, WT Docket No. 07-293, submitted February 16, 2010.

[2] *See* Letter from Terrence R. Smith, Corporate Vice President and Chief Engineering Officer, and James S. Blitz, Vice President, Regulatory Counsel, Sirius XM Radio Inc. to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission, IB Docket No. 95-91, WT Docket No. 07-293, submitted August 3, 2009.

The FCC staff asked whether mobile video transmissions, such as those that are part of a video teleconferencing application, would be widely used by WCS subscribers. Sirius XM responded that it cannot anticipate future consumer adoption of specific applications but noted that few people predicted the popularity of many current consumer uses of the Internet, and that similar video applications are both conceivable and permissible under the rule proposals under consideration in these proceedings. Sirius XM also noted that the Commission should consider the adoption of forward-looking rules that fully consider the exploding bandwidth demands of consumers and the types of applications that will be enabled 5-10 years in the near future.

Mobile video uplink applications are not fanciful predictions of the future. Sirius XM has found numerous examples of mobile video chat applications being developed around the world.[3] As recently as this week, Internet blogs are speculating that the next generation of the iPhone is likely to offer video chat applications.[4] Based on this evidence, Sirius XM continues to believe that mobile video uplink applications should be considered in any analysis of the interference caused by mobile broadband WCS services to satellite radio. The FCC cannot expect that consumers will not use available video chat and other advanced capabilities in the car unless it adopts rules prohibiting such uses.

Finally, the FCC staff asked Sirius XM to propose remedies to address any interference caused to satellite radio reception after WCS mobile broadband deployment. Sirius XM is considering this issue but notes that any such remedies would attempt to redress a problem only after the damage has already been done and service to consumers has been impaired.

[3] *See, e.g.*, "3G Video calling with Windows Mobile", *available at* http://www.youtube.com/watch?v=6gCTdRjBUPg&feature=related; "Video Calling over 3G with HTC Diamond and Nokia N95", *available at* http://www.youtube.com/watch?v=OYVBok0I6EE&feature=related; and "Vodafone Video Call", *available at* http://www.youtube.com/watch?v=awfmrrfedkU&feature=related. All sites last visited Feb. 23, 2010.

[4] *See, e.g.*, "More iPad/iPhone Video Chat Rumors, Feb. 24, 2010, *available at* http://www.boygeniusreport.com/2010/02/24/more-ipadiphone-video-chat-rumors/.

The slides used during this meeting are attached. Please let me know if there are any questions on this submission.

Sincerely,

/*S*/ *Michael A. Lewis*
Michael A. Lewis
Engineering Consultant
Wiley Rein, LLP

Attachment

CC: FCC Participants

Presentation of Additional Data on WCS/Satellite Radio Compatibility

WT Docket No. 07-293
IB Docket No. 95-91

23 February, 2010

Agenda

- **Introduction**
- **Philadelphia WiMAX Network; Data Measurements**
  - Duty Cycle
  - Power Measurements
- **WCS Filter Design**
- **Questions**

Philadelphia WiMax Network; Data Measurements

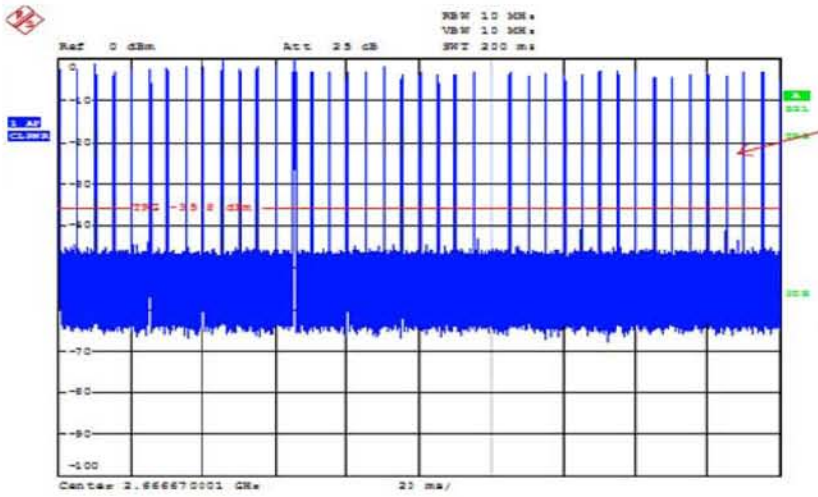
- **Tests performed on Clearwire's 4G WiMAX network operating on BRS/EBS frequencies in the Philadelphia market.**
- **Primary focus on subscriber device activity levels and transmit power while operating on an actual network. The impact of WiMAX base stations was also observed.**
- **Purpose: Promote greater understanding of operational behavior of commercially available WiMAX devices. Provide greater transparency into mobile handset performance than that achieved by the WCS Coalition's demonstrations in Ashburn.**

Philadelphia WiMax Network; Data Measurements

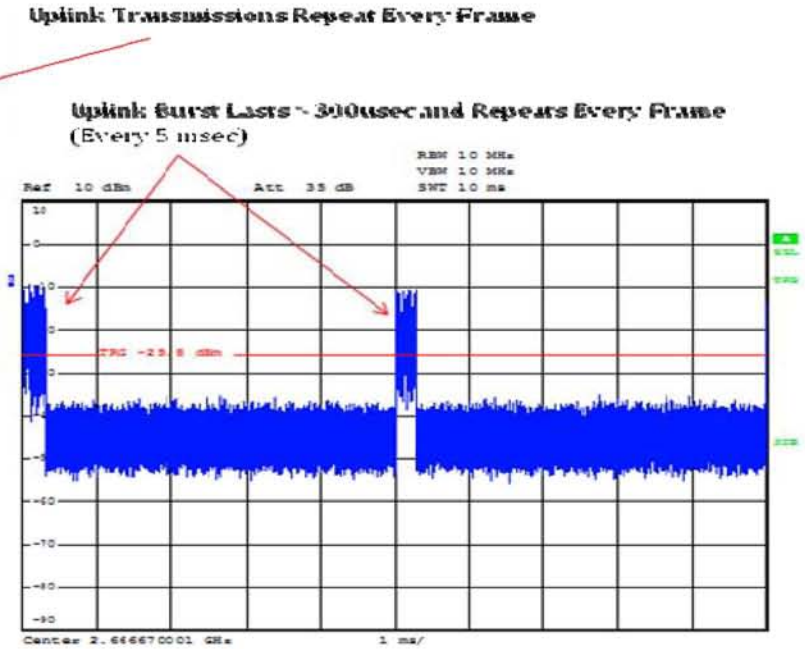
- **Activity Levels and Duty Cycle**
  - Results submitted on Feb. 16.
  - Test Set-Up
    - Description of test device
    - On-board diagnostic software
    - Mobile and stationary performance tests
  - Definitions:
    - *Duty Cycle: the portion of a WiMAX transmission frame that the base station has allocated for uplink traffic.*
    - *Activity Level: the percentage of transmission frames that the user device transmits uplink information to the base station.*

Philadelphia WiMax Network; Data Measurements

The tested subscriber device communicated almost continuously with the network.



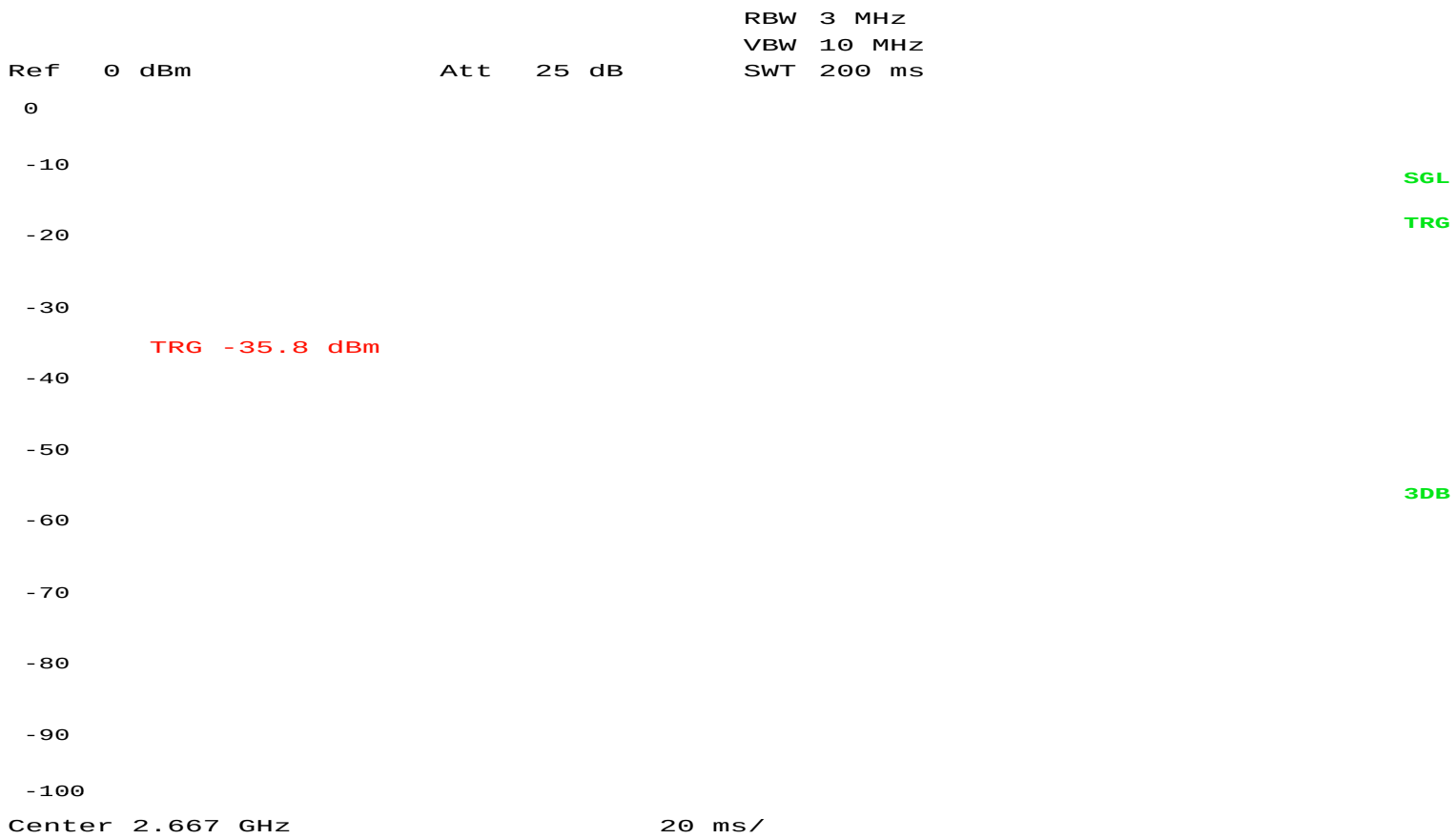
- Plots show power vs. time
- Uplink device sent three Wimax symbols each 5 msec frame for a duty cycle of 6% even without user traffic (300uSec burst)



Zoomed In View

Philadelphia WiMax Network; Data Measurements

Data and Video Applications Occupy the Channel for Significant Periods of Time

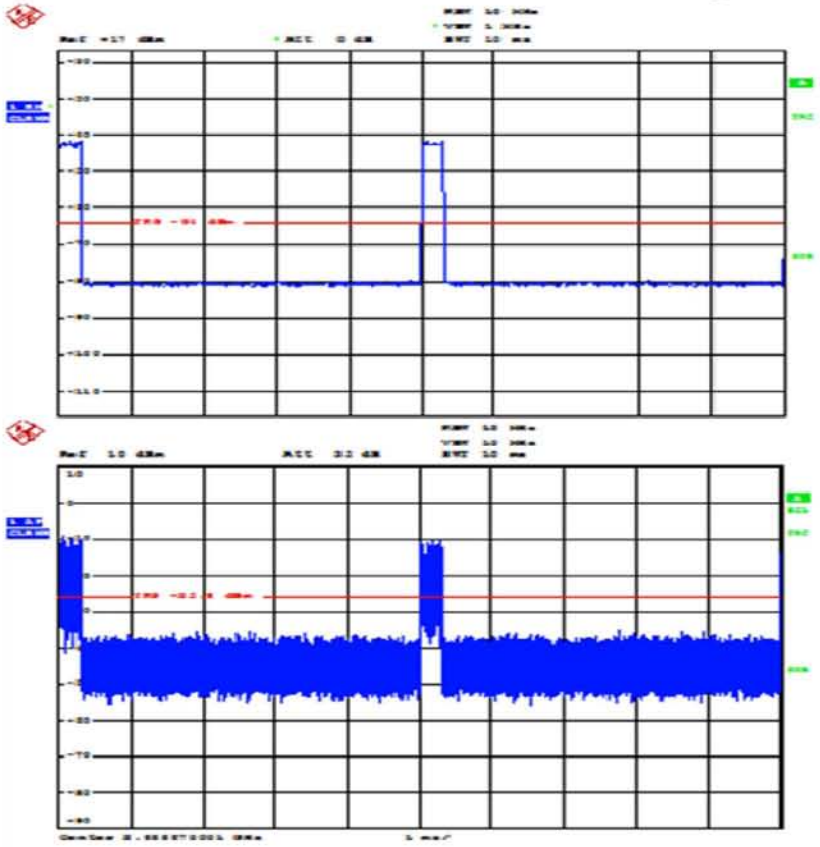


Simultaneous File Upload from 2 Mobile Devices

Philadelphia WiMax Network; Data Measurements

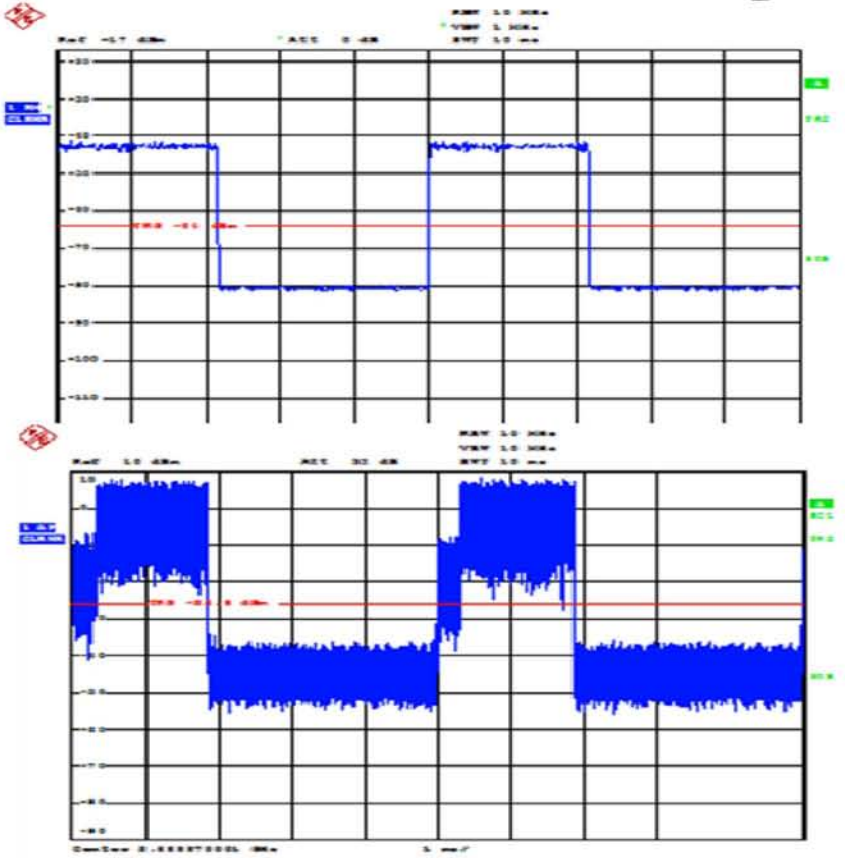
Waveforms used in Sirius XM bench tests correlate with field observations.

Sirius XM Generated 6% WIMAX Signal



Clear WIMAX Modem, Idle-Time Transmission

Sirius XM Generated 43% WIMAX Signal



Clear WIMAX Application Transmit Time

Philadelphia WiMax Network; Data Measurements

- **Subscriber Device Transmit Power Measurements**
  - Yesterday, Sirius XM completed additional measurements on the transmit power of WiMAX subscriber devices operating on the Philadelphia WiMAX network. Full details to be submitted shortly.
  - Preliminary Statement of Observations:
    - While in mobile operation in both urban and suburban Philadelphia, the subscriber device transmitted between 100 - 250 mW a high percentage of the time. High power transmissions (i.e., 250 mW) were recorded even when the device was not performing an application.
    - We measured very high signal levels on the ground from the WiMAX base stations – as high as -35 dBm.
    - An analysis of the data plots shows that base station overload and high mobile transmit power will complement one another to impair satellite radio service over a much greater area.

Philadelphia WiMax Network; Data Measurements

Overarching Conclusion from Philadelphia Measurements

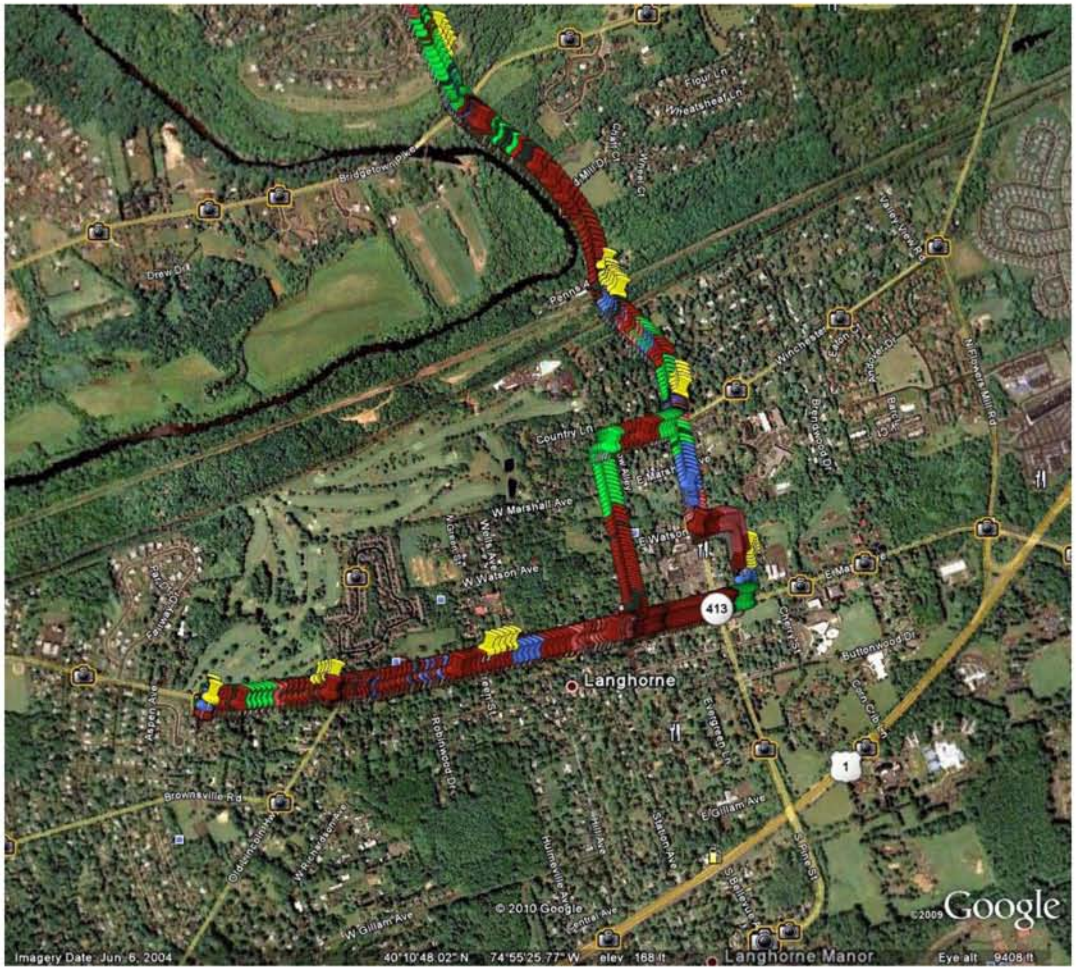
- The Philadelphia WiMAX network deployed provides a data-rich “test market” to make more knowledgeable conclusions on the real-world interference environment that SDARS will face.

- Diagnostic tools are readily available to observe the behavior of WiMAX-based subscriber devices operating on an actual network. These tools provide more transparency into the operating parameters of mobile devices that threaten to create interference to satellite radio receivers. In contrast, no such data was recorded or made available by the WCS Coalition during or after their demonstrations conducted in Ashburn.

- The levels observed in Philadelphia far exceed the statements made during these proceedings by the WCS Coalition about subscriber device activity levels and transmitter power control. The WCS Coalition should explain how their devices will operate differently than Clear’s devices to minimize interference potential.

- The WiMAX base stations in and around Philadelphia place high level signals on the ground in the immediate vicinity of the transmitting site. If WCS base stations place similar levels on the ground, they resultant overload interference will mute satellite radios.

Test Route


Langhorne
413
1
Langhorne Manor
© 2010 Google
©2009 Google
Imagery Date: Jun. 6, 2004
40°10'48.02" N
74°55'25.77" W
elev 168 ft
Eye alt 9408 ft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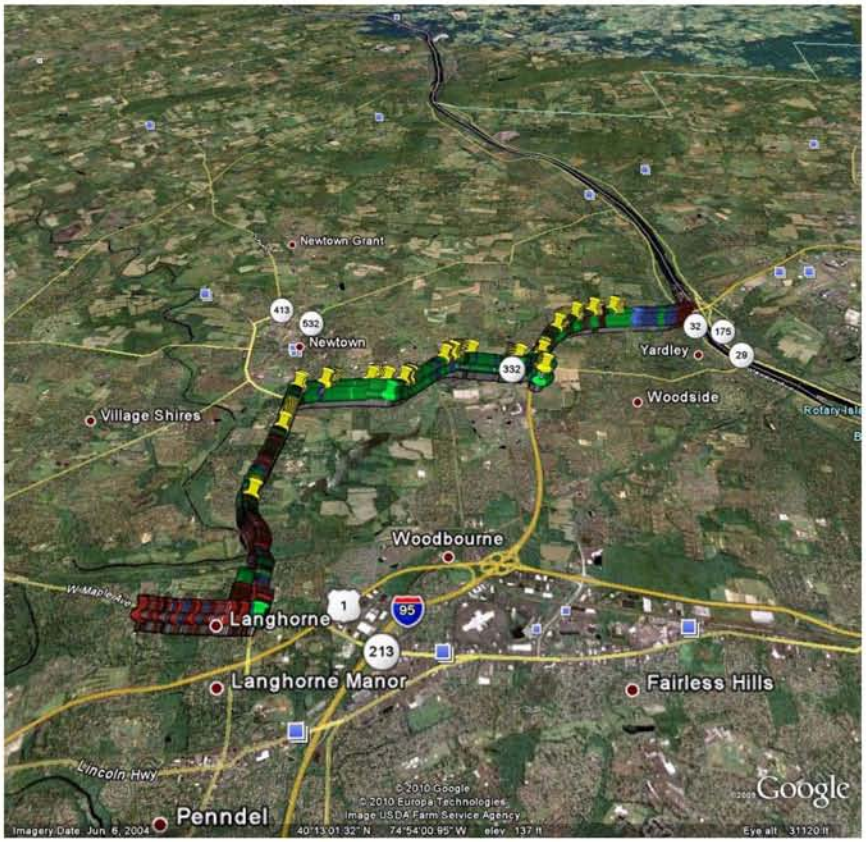
Google

Test Route

- **Test Route covered 10 miles of mixed highway and suburban driving**



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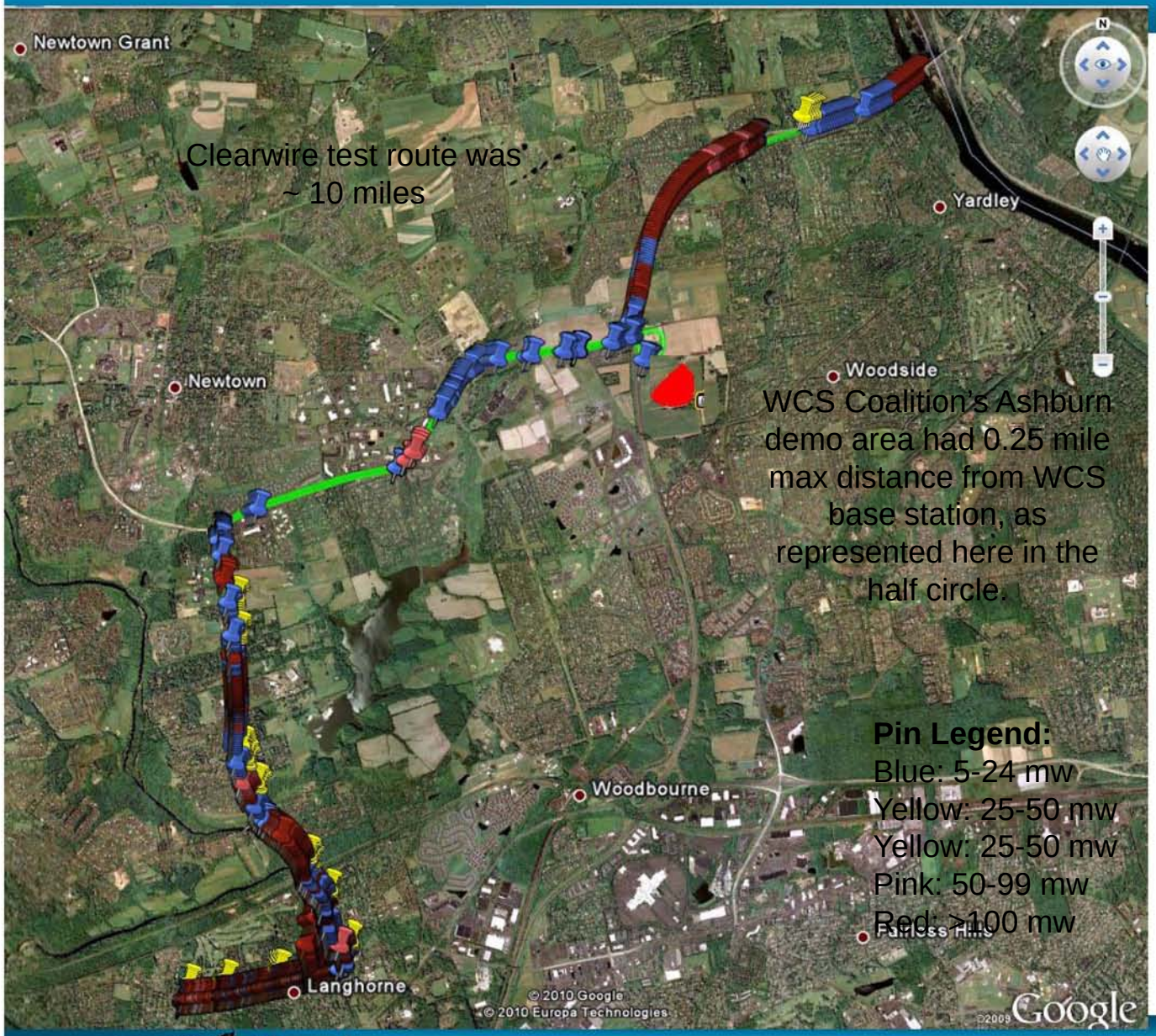
Clearwire Operating Conditions vs. WCS's Ashburn Demo



- The Ashburn demo was limited to distances within 0.25 mile from the base station and operating with at least a 2.5 MHz guard band between the WCS and SDRAS frequencies.

- At such short distances, it's unclear that the full dynamic range of the TPC in the WCS device was tested in Ashburn. Nor was data captured to demonstrate such operation.

- Analysis of the wide area Clearwire network shows that high power uplink transmissions occur frequently and continuously in actual operating conditions.

WCS Filter Design

- In the absence of an effort from the WCS Coalition to identify the potential filter solutions that would reduce interference, Sirius XM commissioned a filter design company to identify solutions that would provide better than 70+10logP OOBE mask with a 5 MHz separation between the operational and neighboring SDARS bands with the following design considerations.
  - 250 mw or -6 dBW transmit power within 5 MHz, or -13 dBW/MHz.
  - With 40 dB immediate spectrum shoulder attenuation of a wide band signal, and the given 5 MHz frequency separation that could provide another 2 dB attenuation, OOBE at the SDARS frequency would lower to -55 dBW/MHz without a filter.
  - As a result, filter attenuation requirement could be specified at 15 dB for a 70+10logP mask.
- TDK-EPCOS evaluated this requirement, and provided an initial design using BAW technology with conservative margins to meet the initial design considerations.
  - This resulted in an initial stringent filter design providing over 25 dB attenuation and capable of operating input power levels up to 1.25W with 1.5 MHz of margin within the 5 MHz separation band, while having 4 dB in-band channel insertion loss and 6 dB at the extreme conditions, and preliminary $2.5 budgetary price for this conservative filter- as opposed to a more relaxed filter that would provide the original design goal of 15 dB attenuation.
  - Note that a typical PCS cellular filter can have a 3.5 dB insertion loss.
- This study concludes that WCS filter solutions are available to provide reasonable interference tolerance to the SDARS frequencies.
- This is an initial feasibility study. Future optimizations of this filter or other solutions can be expected to achieve the targeted lower attenuation levels, decrease the insertion loss and the price. **Advanced filters for WCS subscriber devices can be developed economically. Preliminary estimates are $2.50/filter at low volumes (500k-1,000k units). This falls below $1.00/unit for higher, commercial yields (above 5M units).**

Conclusion

- **Summary and Discussion.**